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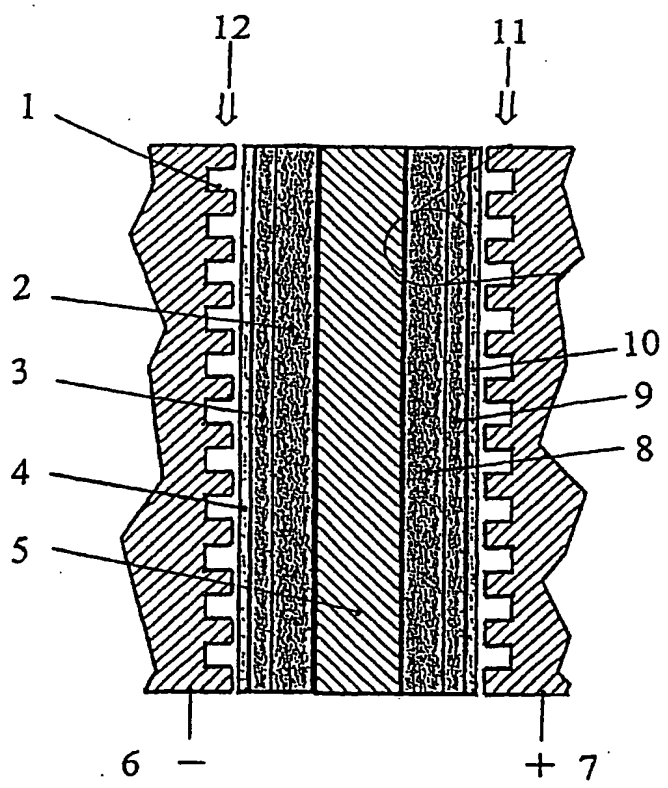
(54) Title: POLYMER ELECTROLYTE MEMBRANE FUEL CELLS



(57) Abstract: A method for preparing polybenzimidazole or polybenzimidazole blend membranes and fabricating gas diffusion electrodes and membrane-electrode assemblies is provided for a high temperature polymer electrolyte membrane fuel cell. Blend polymer electrolyte membranes based on PBI and various thermoplastic polymers for high temperature polymer electrolyte fuel cells have also been developed. Miscible blends are used for solution casting of polymer membranes (solid electrolytes). High conductivity and enhanced mechanical strength were obtained for the blend polymer solid electrolytes. With the thermally resistant polymer, e.g., polybenzimidazole or a mixture of polybenzimidazole and other thermoplastics as binder, the carbon-supported noble metal catalyst is tape-cast onto a hydrophobic supporting substrate. When doped with an acid mixture, electrodes are assembled with an acid doped solid electrolyte membrane by hot-press. The fuel cell can operate at temperatures up to at least 200 °C with hydrogen-rich fuel containing high ratios of carbon monoxide such as 3 vol% carbon monoxide or more, compared to the carbon monoxide tolerance of 10-20 ppm level for Nafion®-based polymer electrolyte fuel cells.

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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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1

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International Application No
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